



Domestic Tuberculosis Elimination

Tuberculosis (TB) is the second leading global infectious disease killer, claiming 1.7 million lives each year. The global pandemic and spread of drug resistant TB present a persistent public health threat to the U.S.

Although the numbers of TB cases in the US continue to decline, with 13,299 new cases reported in 2007, progress towards TB elimination has slowed. The average annual percentage decline in the TB rate slowed from 6.6% per year during 1993--2002 to 3.3% during 2003--2007.¹ Foreign-born and ethnic minorities bear a disproportionate burden of U.S. TB cases. The percentage of TB cases in foreign-born persons in the United States increased from 22% of reported cases in 1986 to 58% in 2007. U.S.-born blacks make up almost half (45%) of all TB cases among U.S.-born persons.

Drug-resistant TB poses a particular challenge to domestic TB control owing to the high costs of treatment and intensive health care resources required. Treatment costs for multidrug-resistant (MDR) TB range from \$100,000 to \$300,000, which can cause a significant strain on state public health budgets. Inpatient care has been estimated for California XDR TB patients from 1993-2006 at an average of approximately \$600,000 per patient. These estimates do not include outpatient costs or productivity losses, which are likely to be substantial for those treated for many years, or for the 25 percent of whom died from XDR TB.²

Challenges to TB Control & Elimination

Despite low rates, persistent challenges to TB control in the U.S. remain. Specifically: (1) racial and ethnic minorities continue to suffer from TB more than majority populations; (2) foreign-born persons are adversely impacted; (3) sporadic outbreaks/clusters occur, outstripping local capacity; (4) continued emergence of drug resistance threaten our ability to control TB; and (5) there are increasingly critical needs for new tools for rapid and reliable diagnosis, short, safe, and effective treatments, and vaccines.

Role of CDC Division of TB Elimination (DTBE)

At the federal level, CDC serves several critical roles in controlling TB. CDC provides leadership, technical and financial assistance, and scientific support for TB control efforts, both nationally and internationally. CDC monitors TB at the national level and develops standards for monitoring TB at the state level. CDC also utilizes expert panels and internal technical expertise to develop TB guidelines to provide guidance on core components of TB control programs, TB control in healthcare settings, use of diagnostic tests, and recommended treatment regimens.

The U.S. works with partners worldwide in an effort to reduce the introduction of TB and drug-resistant TB into the U.S. among immigrants and refugees. CDC is involved with US-Mexico border activities to protect against the development of drug resistance. CDC supports TB prevention and control activities in the four states that border Mexico to ensure

¹ CDC. Reported Tuberculosis in the United States, 2007. Atlanta, GA: U.S. Department of Health and Human Services, CDC, October 2008.

²Jenny Flood, MD, TB Controller, State of California, personal communication.



that these mobile TB patients have uninterrupted access to treatment throughout the entire course of therapy. Finally, CDC also works with the Department of Homeland Security to restrict travel for TB patients until they have received enough therapy to prevent TB transmission.

Strong State and Local TB Control Programs

The best defense against the development of drug resistant tuberculosis is a strong network of state and local public health programs and laboratories. State, local, and territorial health departments provide important TB control services such as directly observed therapy (DOT, a proven method to improve adherence and thus prevent drug resistance), laboratory support, surveillance, contact tracing, and patient counseling. CDC provides about \$100 million annually in support to state, local and territorial health departments to prevent and control TB. Federal funding levels for TB control have been relatively stable, but many state and local governments have faced budget challenges in recent years.

New TB Tools Needed

Although drugs, diagnostics, and vaccines for TB exist, these technologies are antiquated and are increasingly inadequate for controlling the global epidemic. The most commonly used TB diagnostic in the world, sputum microscopy, is more than 100 years old and lacks sensitivity to detect TB in most HIV/AIDS patients and in children. Current tests to detect drug resistance take at least one month to complete. Faster drug susceptibility tests must be developed to stop the spread of drug resistant TB. The TB vaccine, BCG, provides some protection to children, but it has little or no efficacy in preventing pulmonary TB in adults. There is an urgent need for new anti-TB treatments, and particularly for a shorter drug regimen. A shorter drug regimen with new classes of drugs active against susceptible and drug-resistant strains would increase compliance, prevent development of more extensive drug resistance, and save program costs by reducing the time required to directly observe therapy for patients. There is also a critical need for drugs that can safely be taken concurrently with antiretroviral therapy for HIV.

CDC TB Research Programs

Part of the mission of CDC is to conduct programmatically relevant research to develop new tools for TB diagnosis, clinical management, and prevention of latent TB infection (LTBI) and TB disease. Historically, research efforts on TB drugs, diagnostics, and vaccines have been conducted CDC because of the agency's unique expertise in the epidemiology of TB and its relationship to public health departments that are treating patients. CDC's TB research agenda aims to carry out a number of initiatives: continue development of shorter treatment regimens, conduct studies of newer agents and regimens aimed at less toxic and more cost-effective treatment, identify the role of individual pharmacokinetic evaluations, and examine TB treatment issues concerning children, HIV-associated TB, and drug-resistant TB. CDC's research initiatives on TB are conducted through the Tuberculosis Trials Consortium (TBTC) and the TB Epidemiologic Studies Consortium (TBESC), as well as a clinical trial conducted in collaboration with Botswana's Ministry of Health to identify the optimal regimen for preventive TB therapy for HIV-infected persons.

**Legislative Response: The Comprehensive TB Elimination Act (P.L. 110-392)**

The Comprehensive TB Elimination Act was passed unanimously by both chambers of Congress and enacted by the President on October 13, 2008. The bill is the first comprehensive reauthorization of CDC's DTBE in 10 years and responds to the change in TB epidemiology in the U.S. over this decade. P.L. 110-392 provides targeted support to federal, state, and local health authorities to detect, treat, and prevent drug-resistant TB and TB in foreign-born populations and U.S. minorities, and along the U.S.-Mexico border. Specifically, the bill authorizes:

- Funding for CDC's DTBE of \$200 million in FY2009 and \$210 million in FY2010.
- Development by CDC of new tools for TB elimination.

With \$200 million in FY09, the CDC DTBE could support new, high-impact research and program activities at the federal and state level in each of the following priority areas:

1. Interrupt transmission of *Mycobacterium tuberculosis*. Specific examples include identification of optimal new tools for early diagnosis, and short-course therapy for latent TB infection and TB disease. Program activities include identifying areas for program improvement by implementing a National TB Indicators Project, continued use of genotyping data for aberration detection, and evaluating laboratories for proficiency in TB diagnostic procedures.
2. Reduce TB in foreign-born persons. Examples include conducting targeted testing among foreign-born persons, a longitudinal study to evaluate the role of interferon gamma release assays (IGRAs, blood tests that show promise for differentiating between persons with TB disease and those who were vaccinated with BCG), binational activities for completion of therapy among persons who traverse the US-Mexico border, and global disease detection and screening.
3. Reduce TB in U.S. racial/ethnic minority populations. CDC would support operational research based on results from a study of determinants of early diagnosis, prevention, and treatment of TB in the African American community, and demonstration programs for improved contact investigations and increased public awareness for at-risk groups.
4. Reduce global impact of multidrug- and extensively drug-resistant TB. CDC would fund further development of molecular methods for rapidly diagnosing drug resistance, operational research to field test new compounds and their optimal use in drug-resistant cases, and support for regional laboratory and program capacity for reaching underserved areas.
5. Reduce HIV-associated TB. Activities would include further evaluation of preventive therapy for TB in HIV-infected persons, operational research for infection control precautions, and use of IGRAs in HIV-infected TB patients.